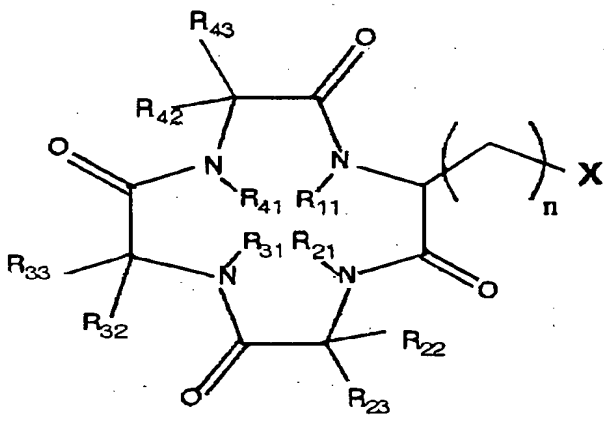
CLAIMS

1. A compound represented by formula (1)



(1)

wherein

R_{11}, R_{21}, R_{31}, and R_{41} independently represent a hydrogen or methyl group;

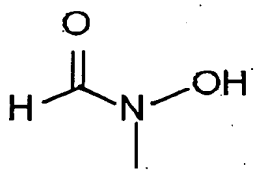
R_{22}, R_{23}, R_{32}, R_{33}, R_{42}, and R_{43} independently represent any one of hydrogen, a linear alkyl group comprising 1 to 6 carbons, a linear alkyl group comprising 1 to 6 carbons to which a non-aromatic cyclic alkyl group or a substituted or unsubstituted aromatic ring is attached, a non-aromatic cyclic alkyl group, or a non-aromatic cyclic alkyl group to which a non-aromatic cyclic alkyl group or a substituted or unsubstituted aromatic ring is attached;

R_{21} and R_{22}, R_{22} and R_{23}, R_{31} and R_{32}, R_{32} and R_{33}, R_{41} and R_{42}, and R_{42} and R_{43} may independently represent a non-cyclic structure without bonding to each other, or may independently represent a cyclic structure by bonding to each other through a linear alkylene group having a chain length of 1 to 5 carbons, a linear alkylene chain having a chain length of 1 to 5 carbons and carrying a branched chain of 1 to 6 carbon atoms, or a linear alkylene chain having a chain length of 1 to 5 carbons and carrying a cyclic structure of 1 to 6 carbon atoms;

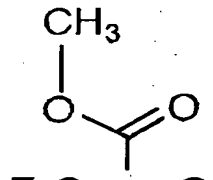
n can be selected from a range of numbers that enable the compound to have HDAC inhibitory activity; and

X represents a structural component having a structure that can coordinate with the zinc positioned at the active center of histone deacetylase.

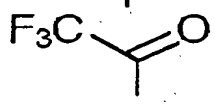
2. The compound of claim 1, wherein X is any one of the substituents represented by the following structural formulas:



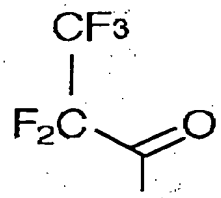
N(OH)COH



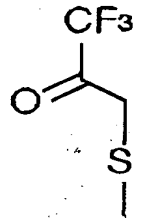
COOMe



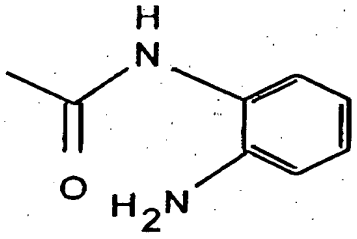
Tfk



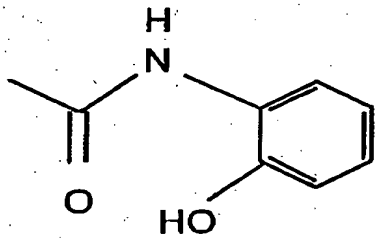
Pfek



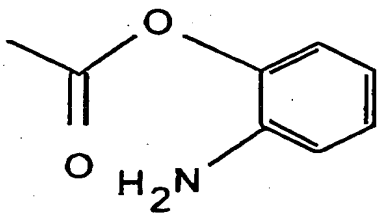
Mtfk



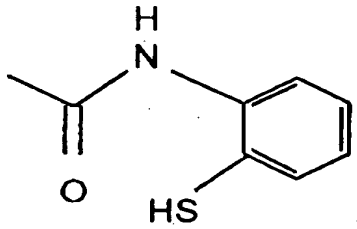
OPD



OAPOH



OAPNH



OATP

3. A histone deacetylase inhibitor comprising the compound of claim 1 as an active ingredient.

4. A tubulin deacetylase inhibitor comprising the compound of claim 1 as an active ingredient.

5. An apoptosis inducer comprising the compound of claim 1 as an active ingredient.

6. A differentiation inducer comprising the compound of claim 1 as an active ingredient.

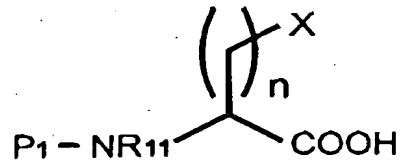
7. An angiogenesis inhibitor comprising the compound of claim 1 as an active ingredient.

8. A cancer metastasis inhibitor comprising the compound of claim 1 as an active ingredient.

9. A pharmaceutical agent for treatment or prevention of a disease caused by histone deacetylase, wherein the agent comprises the compound of claim 1 as an active ingredient.

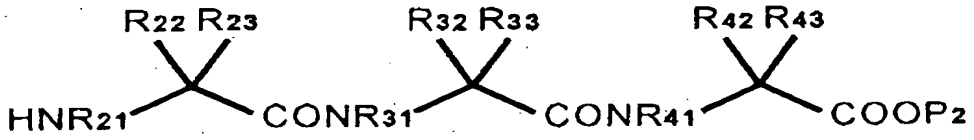
10. The pharmaceutical agent for treatment or prevention of claim 9, wherein the disease caused by histone deacetylase is cancer, autoimmune disease, neurodegenerative disease, skin disease, or infection.

11. A method for producing the compound of claim 1, wherein the method comprises reacting a compound represented by formula (2)



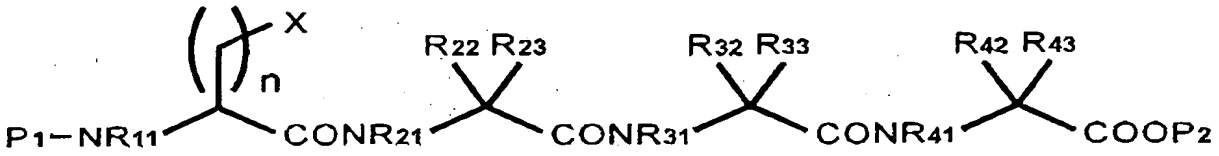
(2)

(wherein n, R_{11}, and X are as defined in claims 1 and 2, and P_1 represents an amino protecting group) with a compound represented by formula (3)



(3)

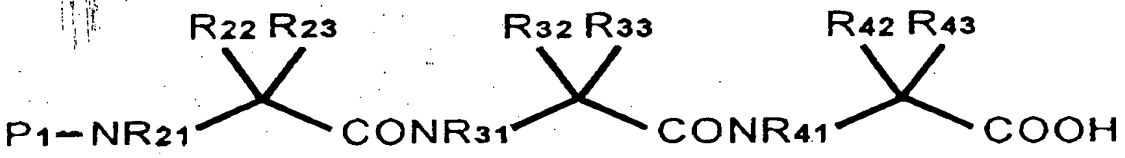
(wherein R_{11}, R_{21}, R_{22}, R_{23}, R_{31}, R_{32}, R_{33}, R_{41}, R_{42}, and R_{43} are as defined in formula (1) of claim 1, and P_2 represents a carboxyl protecting group) in the presence of a peptide coupling agent to yield a compound represented by formula (4)



(4)

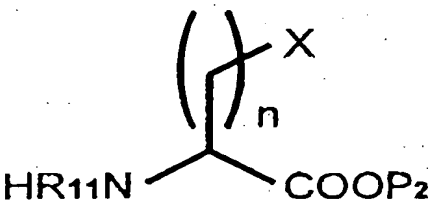
(wherein n, R_{11}, R_{21}, R_{22}, R_{23}, R_{31}, R_{32}, R_{33}, R_{41}, R_{42}, R_{43}, P_1, P_2, and X are as defined above), then subjecting the compound represented by formula (4) to catalytic hydrogenation, acid treatment, or hydrolysis to remove P_1 and P_2, and subsequently, carrying out a cyclization reaction in the presence of a peptide coupling agent;

reacting a compound represented by formula (5)



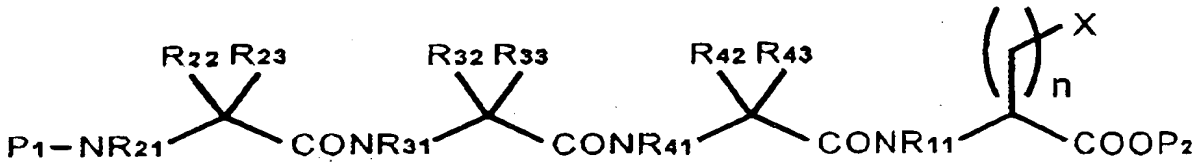
(5)

(wherein R_{21}, R_{22}, R_{23}, R_{31}, R_{32}, R_{33}, R_{41}, R_{42}, R_{43}, and P_1 are as defined above) with a compound represented by formula (6)



(6)

(wherein n, R_{11}, P_2, and X are as defined above) in the presence of a peptide coupling agent to yield a compound represented by formula (7)



(7)

(wherein n, R_{11}, R_{21}, R_{22}, R_{23}, R_{31}, R_{32}, R_{33}, R_{41}, R_{42}, R_{43}, P_1, P_2, and X are as defined above), then subjecting the compound represented by formula (7) to catalytic hydrogenation, acid treatment, fluoride anion treatment, or hydrolysis to remove P_1 and P_2, and subsequently, carrying out a cyclization reaction in the presence of a peptide coupling agent; or reacting a compound in which X of the cyclic tetrapeptide of formula (1) is a carboxyl group or a sulfhydryl group individually with trifluoroacetic anhydride, pentafluoropropanoic anhydride, or 1,1,1-trifluoro-3-bromoacetone to change substituent X into a different type of substituent.